

Abstract Submitted
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Circular orbits on a warped spandex fabric CHAD MIDDLETON,
MICHAEL LANGSTON, Colorado Mesa University — Here we investigate, both
theoretically and experimentally, the circular-like orbits of a marble rolling on a
warped spandex fabric. We show that the mass of the spandex fabric interior to
the orbit of a marble influences the motion of the marble in a nontrivial way. In
fact, the effect of the mass of the spandex fabric on the orbiting marble can actually
dominate over that of the mass of the central object, for small enough central mass.
By measuring the stretch of the spandex fabric near the central object for a variety
of masses, we show that the modulus of elasticity describing the spandex fabric is
not constant and is a function of the stretch. Lastly, we compare the Kepler-like
expression for circular orbits of a marble on the warped spandex fabric in the small
curvature regime to the Kepler-like expression for circular orbits about a spherically-
symmetric massive object in the presence of a constant vacuum energy, as described
by general relativity.

Chad Middleton
Colorado Mesa University

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